01. $\begin{bmatrix} 3 & -1 \\ y & 2 \end{bmatrix}$ $\det A = 7$

$\begin{array}{cc} 3 & -1 & 3 & -1 \\ y & 2 & y & 2 \end{array}$

$1 + 6 = 7 = 7$ (A)

$3y - 2 \quad 3y - 2$

$2 - 3 = y$

$y = -1$

$A^t = \begin{bmatrix} 2 & -1 \\ -1 & 3 \end{bmatrix}$ $\overline{A} = \begin{bmatrix} 2 & -1 \\ -1 & 3 \end{bmatrix}$

$A^{-1} = \dfrac{\begin{bmatrix} 2 & -1 \\ -1 & 3 \end{bmatrix}}{7} = \begin{bmatrix} 2/7 & -1/7 \\ -1/7 & 3/7 \end{bmatrix}$

02.

$\begin{array}{ccc} 1 & e & 1 & 1 & 0 \\ K & 3 & K \\ K & 3 & 1 & K \end{array}$ (C)

$3 + 3K + 3 + 3 + 2K = 0$

$5K = 3 + 3$

$5K = 6$

$K = \dfrac{6}{5}$ $K = 1,2$

03. $A = \begin{bmatrix} 3 & 5 \\ 2 & 4 \end{bmatrix}$ $A^t = \begin{bmatrix} 4 & -2 \\ -5 & 3 \end{bmatrix}$ $\overline{A} = \begin{bmatrix} 4 & -5 \\ -2 & 3 \end{bmatrix}$ $A^{-1} = \dfrac{\begin{bmatrix} 4 & -5 \\ 2 & 3 \end{bmatrix}}{2}$

$12 - 10 = 2$

$\det A = 2$ $A^{-1} = \begin{bmatrix} 2 & -5/2 \\ -1 & 3/2 \end{bmatrix}$ (C)

04. (a)

05. $\begin{bmatrix} -1 & -1 & 2 \\ 2 & 1 & -2 \\ 1 & 1 & -1 \end{bmatrix} \begin{matrix} -1 & -1 \\ 2 & 1 \\ 1 & 1 \end{matrix}$ $A^t = \begin{bmatrix} 3 & 4 & 1 \\ -1 & 1 & -2 \\ 0 & -2 & 3 \end{bmatrix}$ $\overline{A} = \begin{bmatrix} 3 & -1 & 0 \\ 4 & 1 & -2 \\ 1 & -2 & 3 \end{bmatrix}$

$3 + 2 + 1 + 2 + 4 = 11$

$A^{-1} = \begin{bmatrix} 3 & -1 & 0 \\ -4 & 1 & -2 \\ 1 & 0 & ? \end{bmatrix}$ $\begin{bmatrix} & & 0 \\ & & 2/1 \\ & & 4/1 \end{bmatrix}$

$\overline{11}$

$A + A^{-1} = \begin{bmatrix} 1 & 1 & 2 \\ 2 & 1 & 2 \\ 1 & 1 & -1 \end{bmatrix}$

$\begin{bmatrix} 3/1 & & 0 \\ & & 2/1 \\ 1/1 & -2/1 & 3/1 \end{bmatrix}$

$\begin{bmatrix} 2/1 & 2/1 & 0 \\ -2/1 & 2/1 & 4/1 \\ 2/1 & 2/1 & 2/1 \end{bmatrix}$

09. a) $A^2 - AB + BA - B^2$

b) $AB = BA$

c) 1

d) $\det B = \dfrac{1}{\det A}$

06. (B) $X = B^{-1} A^{-1}$

07. $A = \begin{bmatrix} 4 & 5 \\ 5 & 6 \end{bmatrix}$ $A^{-1} = \begin{bmatrix} -6 & 5 \\ 5 & -4 \end{bmatrix}$ (D) $\bar{A} = \begin{bmatrix} -6 & 5 \\ 5 & -4 \end{bmatrix}$

$24 - 25 = 1$ $A^{-1} = \begin{bmatrix} -6 & 5 \\ 5 & -4 \end{bmatrix}$

08. $\begin{bmatrix} 2 & k \\ -2 & 1 \end{bmatrix}$

$2 - 2k = \det A$

$-2k = 2$

$k = \dfrac{2}{-2} = -1 + (-1)$ (B)

$\boxed{k = -2}$